



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/814,252	04/01/2004	Istvan Endre Lukacs	P25051	6976
7055	7590	07/14/2005	EXAMINER	
GREENBLUM & BERNSTEIN, P.L.C. 1950 ROLAND CLARKE PLACE RESTON, VA 20191			NGUYEN, SANG H	
			ART UNIT	PAPER NUMBER
			2877	

DATE MAILED: 07/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/814,252

Applicant(s)

LUKACS ET AL.

Examiner

Sang Nguyen

Art Unit

2877

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 06 May 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-30 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Response to Amendment***

Applicant's response to amendment filed on 5/6/05 has been entered. It is noted that the applicant contains claims 1-30 by the amendment filed on 5/6/05.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 1-2, 4, 6-26, and 28-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kugimiya (U.S. Patent No. 4,547,073) in view of Kohno (U.S. Patent No. 4,705,940).**

**Regarding claims 1-2, 6, 23-25, and 28;** Kugimiya discloses an apparatus and method for fast, quantitative, non-contact topographic investigation of samples, comprising:

- a light source (11 of figure 7);
- a collimating concave mirror (34 of figure 7) structured and arranged to produce a parallel beam (341 of figure 7) and to direct the parallel beam to a sample (13 of figure 7) to be investigated, wherein the samples (13 of figure 7) comprise semiconductor wafers (W of figure 1 and col.3 lines 34-36); and
- an image sensor (14' of figure 7 considered to be an image receiving means

Art Unit: 2877

[col.3 line 40]) structured and arranged to receive a beam reflected (342 of figure 7) from the sample wafer (13 of figure 7) and the concave mirror (34 of figure 7). See figures 1-10.

Kugimiya teaches all of features of claimed invention except for a structured mask located between the light source and the concave mirror, wherein relative positions of the mask and the sensor to other elements of the apparatus are chosen to provide an essentially sharp image of the mask on sensor. However, Kohno teaches that it is known in the art to provide a structured mask (M of figures 1 and 7) located between the light source (IS of figure 1 or La of figure 7) and the concave mirror (M1 of figures 1 and 7), wherein relative positions of the mask (M of figure 7) and the light receiving element (D of figure 7) to other elements (figure 7) of the apparatus are chosen to provide an essentially sharp image of the mask on the light receiving element (D of figure 7). See figures 1-9.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify an apparatus and method for fast, quantitative, non-contact topographic investigation of samples of Kugimiya with a structured mask located between the light source and the concave mirror, wherein relative positions of the mask and the sensor to other elements of the apparatus are chosen to provide an essentially sharp image of the mask on sensor as taught by Kohno for the purpose of scanning accurately exposure sharply images of the mask forming on the sample wafer.

**Regarding claims 4 and 26;** Kugimiya teaches about the concave mirror (34 of figure 7) is an off-axis parabolic mirror (figure 7).

**Regarding claims 7, 10, and 29;** Kugimiya teaches all of features of claimed invention except for a converging lens positioned in front of the light source and mask to be in a beam path and converging or focus lens positioned in front of the sensor/camera to be in beam path. Kohno teaches about a converging lens considered to be a focus lens (Lc of figure 7) positioned in front of the light source (La of figure 7) and mask (M of figure 7) to be in a beam path (figure 7) and Kohno teaches about converging or focus lens (Lr of figure 6) positioned in front of the sensor/camera (D of figure 6) to be in beam path.. It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine an apparatus and method for fast, quantitative, non-contact topographic investigation of samples of Kugimiya with a converging lens positioned in front of the light source and mask to be in a beam path and converging or focus lens positioned in front of the sensor/camera to be in beam path as taught by Kohno for the purpose of focusing and converging the light beams to the sample with high accuracy and sensitivity detection error of focus light beams.

**Regarding claims 8-9;** Kugimiya teaches about the light source (11 of figures 1-5 comprises a laser (col.4 line 55) and converging lens (23 of figures 1-5) for providing a diverging beam.

**Regarding claims 11-13 and 17-19;** Kugimiya teaches all of features of claimed invention except for at least one flat mirror is positioned between the light source or sensor and concave mirror to fold an optical path, wherein the flat mirror is partially

Art Unit: 2877

transmitting mirror or semi-transparent mirror. Kohno teaches that it is known in the art to provide at least one flat mirror (FM1 of figure 7) is positioned between the light source (La of figure 7) or the light receiving element (D of figure 7) and the concave mirror (M1 of figure 7) to fold an optical path, wherein the flat mirror (FM1 of figure 7) is partially transmitting mirror or semi-transparent mirror (figures 1 and 7, and col.3 lines 48-55). It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine an apparatus and method for fast, quantitative, non-contact topographic investigation of samples of Kugimiya with at least one flat mirror is positioned between the light source or sensor and concave mirror to fold an optical path, wherein the flat mirror is partially transmitting mirror or semi-transparent mirror as taught by Kohno for the purpose of reducing error light beam and accurately image on shape of the sample.

**Regarding claims 14-16 and 30;** Kugimiya teaches all of features of claimed invention except for at least one flat mirror is positioned between the sample and the concave mirror to fold an optical path, wherein the flat mirror is partially transmitting mirror or semi-transparent mirror. Kohno teaches that it is known in the art to provide at least one flat mirror (FM2 of figure 1) is positioned between the sample (W of figure 1) and the concave mirror (M1 of figure 1) to fold an optical path, wherein the flat mirror (FM2 of figure 1) is partially transmitting mirror or semi-transparent mirror. It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine an apparatus and method for fast, quantitative, non-contact topographic

investigation of samples of Kugimiya with as taught by Kohno for the purpose of reducing error light beam and accurately image on shape of the sample.

**Regarding claims 20-22;** Kugimiya teaches the sensor(14 of figures 1-5) coupled to a computer (it is inherent to calculate or determine detected shallow unevenness size, height, or distance of the sample [col.1-0-25] and see figures 1-5), wherein the computer for calculating a height (figures 1-5) of a given point (25 of figure 1-5) of the sample (13 of figure 1-5) from a position of an image point on the sensor (14 of figures 1-5).

**Claims 3, 5, 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kugimiya in view of Kohno as applied to claims 1 and 23 above, and further in view of Prior Art of Present Invention (figures 1-3).**

**Regarding claim 3;** Kugimiya teaches all of features of claimed invention except for the light source is a point source. However, PAPI teaches it is known in the art to provide the light source is a point source (1 of figure 3 and page 3 lines 27-29). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify an apparatus and method for fast, quantitative, non-contact topographic investigation of samples of Kugimiya with the light source is a point source as taught by PAPI for the purpose of emitting accurately the parallel light to the sample.

**Regarding claims 5 and 27;** Kugimiya teaches all of features of claimed invention except for the structured mask is a quadratic grid. However, PAPI teaches that it is known in the art to provide the structured mask (2 of figure 2) is a quadratic grid (Page 3 line 14). It would have been obvious to one having ordinary skill in the art at the

time the invention was made to modify an apparatus and method for fast, quantitative, non-contact topographic investigation of samples of Kohno with the structured mask is a quadratic grid as taught by PAPI for the purpose of exposure area of accurate shape image to the sample.

### ***Response to Arguments***

Applicant's arguments, see pages 3-9, filed 5/6/05, with respect to the rejection(s) of claim(s) 1-30 under 103 (a) rejection with Kohno in view of PAPI have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Kugimiya in view of Kohn.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sang Nguyen whose telephone number is (571) 272-2425. The examiner can normally be reached on 9:30 am to 7:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley, Jr. can be reached on (571) 272-2800 ext. 77. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.



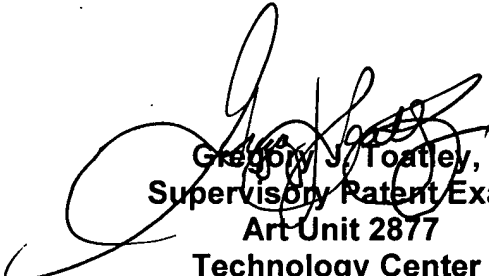
Art Unit: 2877

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SN

Sang Nguyen/SN

July 5, 2005

  
Gregory J. Toatley, Jr.  
Supervisory Patent Examiner  
Art Unit 2877  
Technology Center 2800  
8 July 05